# REMARKS/ARGUMENTS

Claims 1-47 and 49-52 were previously pending in the application. Claims 37 and 42 are canceled. Assuming the entry of this amendment, claims 1-36, 38-41, 43-47 and 49-52 are now pending in the application. The Applicant hereby requests further examination and reconsideration of the application in view of the foregoing amendments and these remarks.

Claims 40-41 and 43-44 are allowed. In paragraph 2, the Examiner rejected claims 1-4, 20-24, 37, 42, 47, and 49-52 under 35 U.S.C. § 102(b) as being anticipated by Morgan. In paragraph 4, the Examiner rejected claims 9-10, 28, 30, 31, and 45 under 35 U.S.C. § 103(a) as being unpatentable over Morgan in view of Bakke. In paragraph 6, the Examiner rejected claims 5, 11-12, 32-33, 38-39, and 46 under 35 U.S.C. § 103(a) as being unpatentable over Morgan in view of Lane. On page 10, the Examiner objected to claims 6-8, 13-19, 25-27, 29, and 34-36 as being dependent upon a rejected base claim, but indicated that those claims would be allowable if rewritten in independent form.

For the following reasons, the Applicant submits that all pending claims are allowable over the cited references.

Claims 1-36, 38-39, 45-47, and 49-50:

Claim 1 is directed to a receiver for identifying a message based upon a received signal. The receiver has a processor and a comparator. The processor generates a minimum threshold and a maximum threshold representing a range for each of a plurality of possible message levels, wherein the sizes of the ranges are different for at least two of the message levels. The comparator identifies the message by comparing the received signal with the generated minimum and maximum thresholds.

Morgan discloses an external programmer device for an implantable medical device (e.g., a pacemaker). The programmer device is adapted to continually monitor the signal strength of a telemetry signal received from the medical device. The programmer device compares the received signal strength with either a minimum threshold alone or with both the minimum threshold and a maximum threshold, where the minimum threshold represents the minimum acceptable signal strength and the maximum threshold indicates that transmitter power is causing an unacceptable drain on the battery of the medical device (col. 2, lines 56-67, and col. 3, lines 1-3). For example, when the programmer device is configured to use the minimum and maximum thresholds, it determines whether the received signal strength is greater than the minimum threshold and less than the maximum threshold. If the signal strength is within those bounds, then the transmitter power in the medical device is not adjusted. However, if the signal strength is less than the minimum threshold, then the programmer device transmits a power adjustment signal to the medical device instructing it to increase its transmitter power to ensure satisfactory telemetry. On the other hand, if the received signal strength is greater than the maximum threshold, then the programmer device transmits a power adjustment signal to the medical device instructing it to decrease the transmitter power to avoid unnecessary drain on the battery of the medical device (col. 3, lines 4-17).

It appears that, in the rejection of claim 1, the Examiner interpreted the different possible signal strengths taught in Morgan to be an equivalent of "a plurality of possible message levels" recited in claim 1. Then, a minimum threshold (Tmin) and a maximum threshold (Tmax) in Morgan must correspond to "a minimum threshold and a maximum threshold representing a range for each of a plurality of possible message levels" recited in claim 1. In, e.g., col. 2, lines 62-65, and col. 6, lines 15-51, Morgan explicitly teaches that comparator 136 in the programmer device is configured to use either one threshold (Tmin) or two thresholds (Tmin and Tmax) regardless of the signal strength, i.e., for each possible signal strength (message level). While it is true that Tmin and Tmax represent a range for each of those possible signal

strengths (message levels), it is also true that Tmin and Tmax define the same range, having the <u>same size</u>, for each possible signal strength (message level). Therefore, for any two signal strengths (message levels) in Morgan, there is just one range size, which is Tmax-Tmin. The Applicant submits that nowhere in the specification does Morgan teach or even suggest the limitation of "wherein the <u>sizes of the ranges are different</u> for at least two of the message levels," as explicitly recited in claim 1, the Examiner's statements to the contrary notwithstanding.

Bakke discloses a burst detector for establishing a coarse timing reference at a signal receiver. The Examiner no longer contends that Bakke teaches or suggests the limitation of "wherein the sizes of the ranges are different for at least two of the message levels."

Lane teaches a circuit (e.g., circuit 500 of Fig. 5) designed to determine the constellation size of a quadrature amplitude modulated (QAM) signal. More specifically, circuit 500 is designed to determine whether a received QAM signal is a 16-ary or 32-ary QAM signal (see, e.g., col. 9, lines 15-18). Circuit 500 operates by first squaring and normalizing the received QAM signal, and then analyzing the probability distribution function (pdf) of the normalized signal accumulated over a predetermined period of time (see, e.g., col. 7, lines 13-44). For the pdf analysis, circuit 500 has pdf analyzing circuit 506 configured with two bins labeled BIN 2 and BIN 3. Each bin is configured to count instances of signal occurrence within the bin boundaries that are defined by the levels of the corresponding upper and lower threshold signals applied to the bin comparators (i.e., comparators 512 and 514 of BIN 2 and comparators 516 and 518 of BIN 3). The level difference between the upper and lower threshold signals determines the bin width for each of the bins (see, e.g., col. 8, lines 12-14). The number of counts produced in each bin are compared with one another at the end of the accumulation period to determine whether the QAM signal is 16-ary or 32-ary.

On page 10 of the office action, with respect to Lane, the Examiner stated:

> In page 11, of the response applicant assets that Lane does not teach message levels having different sizes. Examiner respectfully disagrees. In fact Lane teaches number of bins having different constellation sizes (see col. 3, lines 30-40). Therefore applicant's arguments are moot.

The text from Lane (col. 3, lines 30-40) cited by the Examiner reads as follows:

> The number of bins and their specific locations depend upon the number of different constellation sizes and the size of those constellations that are expected to be received. In operation, a counter associated with each bin counts (accumulates) the number of symbols that fall therein. The symbols are counted over a fixed time period. At the end of the period, my technique compares, to one another, the number of symbols counted by each counter. The result of the comparison indicates the number of modulation levels for the QAM signal being received which, in turn, indicates the constellation size of that QAM signal.

The phrase "Lane teaches number of bins having different constellation sizes" in the Examiner's statement mentions at least three different terms referred to by Lane in the cited text: (1) the number of bins, (2) the constellation size, and (3) the number of different constellation sizes. Explanations of these terms provided by Lane throughout his specification can be summarized as follows. The number of bins is determined by the number of counters in the corresponding pdf analyzing circuit. For example, pdf analyzing circuit 506 shown in Lane's Fig. 5 has two counters 520 and 522, and therefore two bins (BIN 2 and BIN 3). The constellation size is the number of points in the constellation. For example, Lane's

Fig. 1 shows two representative constellations indicated by "X" and "o" points, respectively. The constellation shown by "X" points has 16 such points and therefore its constellation size is 16. Similarly, the constellation shown by "o" points has 32 such points and therefore its constellation size is 32. Finally, the number of different constellation sizes is the number of different constellations that the circuit disclosed by Lane is able to distinguish. For example, from col. 4, line 6, through col. 9, line 14, Lane describes a circuit that can distinguish two different constellations, i.e., 16-ary and 32-ary. For this circuit, the number of different constellation sizes is two. In col. 9, lines 46-59, Lane mentions a circuit that can distinguish three different constellations, i.e., 16-ary, 32-ary, and 64-ary. For that circuit, the number of different constellation sizes is three.

In view of these explanations, the phrase "Lane teaches number of bins having different constellation sizes" is very confusing and ambiguous. For example, it can be said that Lane teaches how to select the number of bins for distinguishing different constellation sizes, or that Lane teaches how to configure bins for a given number of different constellation sizes. However, the meaning intended by the Examiner cannot be clearly ascertained from the present wording of the Examiner's statement. As such, the Applicant requests further explanation and clarification.

If the Examiner intended to say that Lane teaches bins having different widths, then the Applicant disagrees for the following reasons. In the description of circuit 500 (Fig. 5), Lane explicitly teaches that BIN 2 and BIN 3 have the <u>same width</u> with a value of, e.g., 0.25 of the normalized power (col. 8, lines 12-26). More specifically, Lane teaches that (I) one of the bins has threshold levels of 0.375 and 0.625 (col. 8, lines 17-20) and (II) the other bin has threshold levels of 0.875 and 1.125 (col. 8, lines 23-26). As such, both BIN 2 and BIN 3 have the same width (i.e., 0.625−0.375=1.125−0.875=0.25). The Applicant submits that nowhere in the description of circuit 500 (see columns 7-10) does Lane teach or even suggest bins (message levels) having different widths (sizes of the ranges).

Furthermore, the sole purpose of Lane's Fig. 3 is to teach how to choose a <u>single optimal width</u> value that would work relatively well for both 16-ary and 32-ary QAM signals. More specifically, curves 302 and 304 of Fig. 3 show the probability of error as a function of bin width for 16-ary and 32-ary QAM signals, respectively. Based on these curves Lane specifies that, to minimize the probability of error, a single optimal bin width should be selected from values between 0.25 and 0.3 of the normalized power (col. 6, lines 57-60). Lane seeks a uniform size for all bins and explicitly provides that a single compromise bin width should be selected. According to Lane, this compromise bin width should correspond to neither of the curve minima, but, rather, belong to a range (0.25 to 0.3) located between the curve minima. In view of (i) Lane's lack of recognition of possible use of different widths in different bins and (ii) the explicit teaching directed to the selection of a single optimal width for all bins, the Applicant submits that, not only Lane does <u>not</u> teach or suggest different widths for different bins, but Lane, in fact, teaches away from selecting different widths for different bins.

For all these reasons, the Applicant submits that claim 1 is allowable over Morgan, Bakke, and Lane, taken independently or in combination. For similar reasons, the Applicant submits that claims 10, 20, 21, and 47 are also allowable over Morgan, Bakke, and Lane. Since claims 2-9, 11-19, 22-36, 38-39, 45-46, and 49-50 depend variously from claims 1, 10, 20, 21, and 47, it is further submitted that those claims are also allowable over Morgan, Bakke, and Lane. In view of the foregoing, the Applicant submits that the rejections of claims 1-36, 38-39, 45-46, 47, and 49-50 under §§ 102 and 103 have been overcome.

<u>Claims 51-52:</u>

Claims 51 and 52 depend from claim 41. Since claim 41 is allowed, the Applicant submits that claims 51-52 are allowable.

In view of the above amendments and remarks, the Applicant believes that the now-pending claims are in condition for allowance. Therefore, the Applicant believes that the entire application is now in condition for allowance, and early and favorable action is respectfully solicited.

Respectfully submitted,

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